

Notice of Allowability

Application No.

10/770,503

Examiner

Xiuqin Sun

Applicant(s)

JO ET AL.

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 02/04/2004.
2. ☒ The allowed claim(s) is/are 1-4.
3. ☒ The drawings filed on 04 February 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 03/01/05
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Benjamin J. Hauptman, on 03/01/2005.

3. The application has been amended as follows:

1). Replace the abstract with the following:

-- A method of finding a dip angle in a tilt-compensated electronic compass includes the steps of a) setting a predetermined azimuth angle indicative of a horizontal status of a geomagnetic sensor to a reference azimuth angle; b) if the compass is slightly tilted, stepwise-increasing a dip angle within a predetermined dip angle search range, and calculating azimuth angles associated with individual dip angles; c) comparing the calculated azimuth angles with the reference azimuth angle, and finding one azimuth angle, which is closest to the reference azimuth angle, among the calculated azimuth angles; and d) setting the dip angle applied to the closest azimuth angle to a specific dip angle associated with a corresponding azimuth angle, such that a more accurate azimuth angle can be detected by the on the basis of the calculated dip angle.--

2). In the specification, page 2, line 15, please change "Fig. 2a" into -- Fig. 1b --.

Allowable Subject Matter

4. Claims 1 and 4 are allowed.

Reasons for Allowance

5. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of claims 1 and 4 is the inclusion of the claimed method steps of: b) if the electronic compass is slightly tilted on the basis of said reference azimuth angle, stepwise increasing a dip angle within a predetermined dip angle search range, and calculating azimuth angles associated with individual dip angles; c) comparing the calculated azimuth angles with the prescribed reference azimuth angle, and finding one azimuth angle, which is the closest to the reference azimuth angle, from among the calculated azimuth angles; and d) setting the dip angle applied to the found azimuth angle to a specific dip angle associated with a corresponding azimuth angle. It is these steps found in each of the claims, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which make these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Prior Art Citations

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) Roesler et al. (RE33708) is entitled "Surveying of boreholes using shortened non-magnetic collars".

2) Kato et al. (U.S. Pub. No. 20030134665) is entitled "Electronic apparatus".

3) Woloszyk et al. (U.S. Pub. No. 20030023380) is entitled "Method of automatic continuous calibration for an electronic compass".

4) Smith et al. (U.S. Pub. No. 20020100178) is entitled "Electronic compass and compensation of large magnetic errors for operation over all orientations".

5) Gavril et al. (U.S. Pat. No. 5,095,631) is entitled "Magnetic compass".

6) Monteiro et al. (U.S. Pat. No. 6701631) is entitled "Convertible directional azimuth and dip measuring modular compass and method".

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (571)272-2280. The examiner can normally be reached on 6:30am-4:00pm.

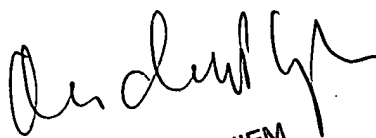
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571)272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2863

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Xiuqin Sun
Examiner
Art Unit 2863

XS
March 10, 2005


MICHAEL NGHIEM
PRIMARY EXAMINER